

Please amend the above-identified patent application as follows:

IN THE CLAIMS:

Please amend Claim 32 as follows:

Claims 1-2 (Canceled)

3. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially countering an optical path of the ambient light collected by the light collector, wherein the light collector illuminates the rear surface of the liquid crystal display panel, and the light receiving device detects the amount of collected ambient light; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in accordance with the amount of the detected ambient light, wherein the predetermined display characteristic includes transmittance, the control circuit changing a minimum transmittance in accordance with the amount of collected ambient light, and wherein the liquid crystal display panel includes electrodes to which a voltage of a predetermined range

is applied, wherein the control circuit shifts the predetermined voltage range in accordance with the amount of collected ambient light to thereby change the minimum transmittance, wherein the liquid crystal display panel includes:

first and second substrates opposing to each other;

20 a liquid crystal layer arranged between the first and second substrates; and

a sealed portion for sealing the liquid crystal layer and defining a peripheral area and a display area of the liquid crystal display panel, wherein the light receiving device is formed on one of the facing surfaces of the first and second substrates in the peripheral area and is formed between the first and second substrates.

4. (Original) The apparatus according to claim 3, wherein the liquid crystal display panel is operated in a normally white mode, and wherein the control circuit shifts the predetermined voltage range to a high voltage range in order to decrease the minimum transmittance when the amount of collected ambient light is equal to or greater than a
5 predetermined value.

5. (Original) The apparatus according to claim 3, wherein the liquid crystal display panel is operated in a normally black mode, and wherein the control circuit shifts the predetermined voltage range to a low voltage range in order to decrease the minimum transmittance when the amount of collected ambient light is equal to or greater than a
5 predetermined value.

6. (Canceled)

7. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially countering an optical path of the ambient light collected by the light collector, wherein the light collector illuminates the rear surface of the liquid crystal display panel, and the light receiving device detects the amount of collected ambient light; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in accordance with the amount of the detected ambient light, wherein the predetermined display characteristic includes contrast ratio, the control circuit adjusting the contrast ratio of the liquid crystal display panel in accordance with the amount of collected ambient light, and wherein the liquid crystal display panel includes electrodes to which a voltage of a predetermined range is applied, and wherein the control circuit narrows the predetermined voltage range in order to decrease the contrast ratio when the amount of collected ambient light is equal to or greater than a predetermined value, wherein the liquid crystal display panel includes:

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first and second substrates opposing to each other;

a liquid crystal layer arranged between the first and second substrates; and

a sealed portion for sealing the liquid crystal layer and defining a peripheral area and

a display area of the liquid crystal display panel, wherein the light receiving device

is formed on one of the facing surfaces of the first and second substrates in the

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peripheral area and is formed between the first and second substrates.

8. (Previously Amended) The apparatus according to claim 9, wherein the control circuit is connected to the light source, the control circuit turning off the light source when the amount of collected ambient light is equal to or greater than a predetermined value and turning on the light source when the amount of collected ambient light is less than the predetermined value.

9. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

a luminescent unit located adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, and a light source,

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wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially countering the ambient light directed toward the light collector to detect the amount of ambient light collected by the light collector; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic
10 in accordance with the amount of the detected ambient light, wherein the predetermined display characteristic includes transmittance, the control circuit changing a minimum transmittance in accordance with the amount of collected ambient light, and, wherein the luminescent unit includes a cover that moves between an open and closed position to selectively cover the light collector, and wherein the apparatus includes a cover driving
15 apparatus connected to the control circuit to move the cover between the open and closed positions and the predetermined display characteristic includes opening and closing of the cover.

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10. (Original) The apparatus according to claim 9, wherein the control circuit controls the cover driving apparatus such that the cover moves to the open position to expose the light collector when the amount of collected light becomes equal to or greater than a predetermined value and moves to the closed position to cover the light collector when the
5 amount of collected ambient light becomes smaller than a predetermined value.

11. (Original) The apparatus according to claim 9, wherein the control circuit is connected to the light source, and wherein the control circuit controls the light source and the cover driving apparatus such that the light source is turned on and the cover is closed when the amount of collected ambient light is equal to or smaller than a first predetermined

5 value, the cover is opened when the amount of collected ambient light exceeds the first predetermined value, and the light source is turned off when the amount of collected ambient light exceeds a second predetermined value, which is greater than the first predetermined value.

13 - 15 (canceled).

16. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

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a luminescent unit arranged adjacent to the liquid crystal display panel for providing light to the display panel to illuminate the display panel, wherein the luminescent unit
5 includes a light collector, which collects ambient light, and a light source, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially countering an optical path of the ambient light collected by the light collector, wherein the light collector illuminates the rear surface of the liquid crystal display panel, and the light receiving device generates a light amount signal
10 corresponding to the amount of collected ambient light; and

a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in accordance with the light amount signal, wherein the liquid crystal display panel includes:
first and second substrates opposing to each other;

15 a liquid crystal layer arranged between the first and second substrates; and
a sealed portion for sealing the liquid crystal layer and defining a peripheral area and
a display area of the liquid crystal display panel, wherein the light receiving device is formed
on one of the facing surfaces of the first and second substrates in the peripheral area and is
arranged between the first and second substrates.

17. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel having a predetermined display characteristic;

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5 a luminescent unit arranged adjacent to the liquid crystal display panel for providing
light to the display panel to illuminate the display panel, wherein the luminescent unit
includes a light collector, which collects ambient light, and a light source, wherein the
collected ambient light is used as a backlight of the liquid crystal display panel;

a light receiving device substantially counteracting an optical path of the ambient light
collected by the light collector, wherein the light collector illuminates the rear surface of the
liquid crystal display panel, and the light receiving device generates a light amount signal
10 corresponding to the amount of collected ambient light; and

a control circuit electrically connected to the liquid crystal display panel and the light
receiving device, wherein the control circuit varies the predetermined display characteristic
in accordance with the light amount signal, wherein the liquid crystal display panel includes
a pair of substrates, and wherein the light receiving device is arranged facing the luminescent

15 unit on one of the substrates and adjacent to the display area of the liquid crystal display panel, wherein the liquid crystal display panel includes:

first and second substrates opposing to each other;

a liquid crystal layer arranged between the first and second substrates; and

a sealed portion for sealing the liquid crystal layer and defining a peripheral area and

20 a display area of the liquid crystal display panel, wherein the light receiving device is formed on one of the facing surfaces of the first and second substrates in the peripheral area and is formed between the first and second substrates.

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18. (Previously Amended) The apparatus according to claim 16, wherein the predetermined display characteristic includes transmittance, the control circuit changing the minimum transmittance, in accordance with the light amount signal.

19. (Previously Amended) The apparatus according to claim 16, wherein the predetermined display characteristic includes contrast ratio, the control circuit changing the contrast ratio in accordance with the light amount signal.

20 - 21. (Canceled).

22. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

10 a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:

a judgment circuit for generating at least one of a contrast ratio adjustment signal, a brightness adjustment signal, a cover driving signal and an ON/OFF signal in accordance with the light receiving signal;

20 a contrast ratio adjustment circuit connected to the judgment circuit, the contrast ratio adjustment circuit processing an image signal to adjust the contrast ratio in accordance with the contrast ratio adjustment signal; and

25 a brightness adjustment circuit connected to the contrast ratio adjustment circuit and the liquid crystal display panel, the brightness adjustment circuit processing the image signal, which contrast ratio has been adjusted, to adjust the brightness in accordance with the brightness adjustment signal, and wherein the judgment circuit includes:

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a first judgment circuit for receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a first criterion value to generate a contrast ratio adjustment signal;

30 a second judgment circuit for receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a second criterion value to generate a brightness adjustment signal;

35 a third judgment circuit connected to the cover driving apparatus, the third judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving with a third criterion value to generate a cover driving signal; and

a fourth judgment circuit connected to the light source, the fourth judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a fourth criterion value to generate an ON/OFF signal.

23. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

10 a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:

a linear contrast ratio adjustment circuit for receiving the light receiving signal and processing an image signal to adjust the contrast ratio in a linear manner in accordance with the light receiving signal;

20 a linear brightness adjustment circuit connected to the linear contrast ratio adjustment circuit and the liquid crystal display panel, the linear brightness adjustment circuit

receiving the light receiving signal from the light receiving device and processing the image signal, which contrast ratio has been adjusted, to adjust the brightness in a linear manner in accordance with the light receiving signal;

25 a first judgment circuit connected to the cover driving apparatus, the first judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a first criterion value to generate a cover driving signal; and

30 a second judgment circuit connected to the light source, the second judgment circuit receiving the light receiving signal from the light receiving device and comparing the light receiving signal with a second criterion value to generate an ON/OFF signal.

24. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

10 a light receiving device substantially countering the ambient light directed toward the
light collector to generate a light receiving signal corresponding to the amount of ambient
light collected by the light collector; and

15 a control circuit connected to the liquid crystal display panel, the light receiving
device, the light source, and the cover driving apparatus, wherein the control circuit controls
an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast
ratio and the brightness in accordance with the light receiving signal, wherein the control
circuit includes:

an analog-to-digital converter connected to the light receiving device to
convert the light receiving signal to a digital light receiving signal;

20 a judgment circuit connected to the analog-to-digital converter, the cover
drive apparatus, and the light source, wherein the judgment circuit compares the digital light
receiving signal with a first criterion value to generate a contrast ratio adjustment signal,
compares the digital light receiving signal with a second criterion value to generate a
brightness adjustment signal, compares the digital light receiving signal with a third criterion
value to generate a cover driving signal, and compares the digital light receiving signal with
25 a fourth criterion value to generate an ON/OFF signal;

a multiplier connected to the judgment circuit to multiply a digital image
signal with the contrast ratio adjustment signal to adjust the contrast ratio thereof;

an adder-subtractor connected to the multiplier and the judgment circuit to perform summation and subtraction on the digital image signal, which contrast ratio has been adjusted, with the brightness adjustment signal to adjust the brightness;

a digital signal processing circuit connected to the adder-subtractor to perform a predetermined digital signal process on the digital image signal, which contrast ratio and brightness have been adjusted; and

a digital-to-analog converter connected between the digital signal processing circuit and the liquid crystal display panel to convert the processed digital image signal to an analog image signal.

25. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes to selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

a light receiving device substantially countering the ambient light directed toward the light collector to generate a light receiving signal corresponding to the amount of ambient light collected by the light collector; and

15 a control circuit connected to the liquid crystal display panel, the light receiving device, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source, the opening and closing of the cover, and adjusts the contrast ratio and the brightness in accordance with the light receiving signal, wherein the control circuit includes:

an analog-to-digital converter connected to the light receiving device to convert the light receiving signal to digital light receiving signal;

20 a multiplier connected to the analog-to-digital converter to multiply the digital image signal with the digital light receiving signal to adjust the contrast ratio thereof;

an adder-subtractor connected to the multiplier and the analog-to-digital converter to perform summation and subtraction on the digital image signal, which contrast ratio has been adjusted, with the digital light receiving signal to adjust the brightness; and

25 a judgment circuit connected to the analog-to-digital converter, the cover driving apparatus, and the light source, wherein the judgment circuit compares the digital light receiving signal with a first criterion value to generate a cover driving signal and compares the digital light receiving signal with a second criterion value to generate an ON/OFF signal.

26. (Previously Amended) A liquid crystal display apparatus comprising:

a liquid crystal display panel for displaying an image having a predetermined contrast ratio and brightness;

5 a luminescent unit arranged adjacent to the liquid crystal display panel, wherein the luminescent unit includes a light collector, which collects ambient light, a light source, and a cover, which opens and closes too selectively cover the light collector, wherein the collected ambient light is used as a backlight of the liquid crystal display panel;

a cover driving apparatus for opening and closing the cover;

10 a first light receiving device substantially countering the ambient light directed toward the light collector to generate a first light receiving signal corresponding to amount of ambient light collected by the light collector;

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a second light receiving device for generating a second light receiving signal corresponding to a total amount of light illuminating the liquid crystal panel, which includes the ambient light and the light of the light source; and

15 a control circuit connected to the liquid crystal display panel, the first and second light receiving devices, the light source, and the cover driving apparatus, wherein the control circuit controls an ON/OFF of the light source and the opening and closing of the cover in accordance with the first light receiving signal, and adjusts the contrast ratio and the brightness in accordance with the second light receiving signal.

27. (Original) The apparatus according to claim 26, wherein the control circuit includes:

a judgment circuit for generating at least one of a contrast ratio adjustment signal, a brightness adjustment signal, a cover driving signal and an ON/OFF signal in accordance with at least one of the first and second light receiving signals;

a contrast ratio adjustment circuit connected to the first judgment circuit, the contrast ratio adjustment circuit processing an image signal to adjust the contrast ratio of the image signal in accordance with the contrast ratio adjustment signal; and

a brightness adjustment circuit connected to the contrast ratio adjustment circuit and the liquid crystal display panel, the brightness adjustment circuit processing the image signal, which contrast ratio has been adjusted, to adjust the brightness in accordance with the brightness adjustment signal from the second judgment circuit.

28. (Original) The apparatus according to claim 27, wherein the judgment circuit includes:

a first judgment circuit for receiving the second light receiving signal from the second light receiving device and comparing the second light receiving signal with a first criterion value to generate a contrast ratio adjustment signal;

a second judgment circuit for receiving the second light receiving signal from the second light receiving device and comparing the second light receiving signal with a second criterion value to generate a brightness adjustment signal;

a third judgment circuit connected to the cover driving apparatus, the third judgment circuit receiving the first light receiving signal from the first light receiving device and

comparing the first light receiving signal with a third criterion value to generate a cover driving signal; and

a fourth judgment circuit connected to the light source, the fourth judgment circuit receiving the first light receiving signal from the first light receiving device and comparing the first light receiving signal with a fourth criterion value to generate an ON/OFF signal.

29. (Original) The apparatus according to claim 26, wherein the control circuit includes:

a linear contrast ratio adjustment circuit for receiving the second light receiving signal from the second light receiving device and processing an image signal to adjust the contrast ratio in a linear manner in accordance with the second light receiving signal;

a linear brightness adjustment circuit connected to the linear contrast ratio adjustment circuit and the liquid crystal display panel, the linear brightness adjustment circuit receiving the second light receiving signal from the second light receiving device and processing the image signal, which contrast ratio has been adjusted, to adjust the brightness in a linear manner in accordance with the second light receiving signal;

a first judgment circuit connected to the cover driving apparatus, the first judgment circuit receiving the first light receiving signal from the first light receiving device and comparing the first light receiving signal with a first criterion value to generate a cover driving signal; and

15 a second judgment circuit connected to the light source, the second judgment circuit receiving the first light receiving signal from the first light receiving device and comparing the first light receiving signal with a second criterion value to generate an ON/OFF signal.

30. (Previously Added) The apparatus according to claim 17, wherein the predetermined display characteristic includes transmittance, the control circuit changing the minimum transmittance in accordance with the light amount signal.

31. (Previously Added) The apparatus according to claim 17, wherein the predetermined display characteristic includes contrast ratio, the control circuit changing the contrast ratio in accordance with the light amount signal.

32. (Currently Amended) A liquid display apparatus comprising:
a liquid crystal display panel having a predetermined display characteristic, wherein the liquid crystal display panel includes,

first and second substrates opposing to each other, and

5 a liquid crystal layer arranged between the first and second substrates;

a light receiving device which is formed on one of the ~~first and second substrates~~
between opposing surfaces of the first and second substrates and generates a light amount signal; and

10 a control circuit electrically connected to the liquid crystal display panel and the light receiving device, wherein the control circuit varies the predetermined display characteristic in accordance with the light amount signal.

33. (Previously Added) The apparatus according to Claim 32, wherein the liquid crystal display panel includes thin film transistors arranged on one of the first and second substrates, and wherein the light receiving device is arranged on the same substrate as the thin film transistors.

34. (Previously Added) The apparatus according to Claim 32, wherein the liquid crystal display panel includes thin film transistors arranged on one of the first and second substrates, and wherein the light receiving device is selected to be formed by a same manufacturing process as the thin film transistors.